

```

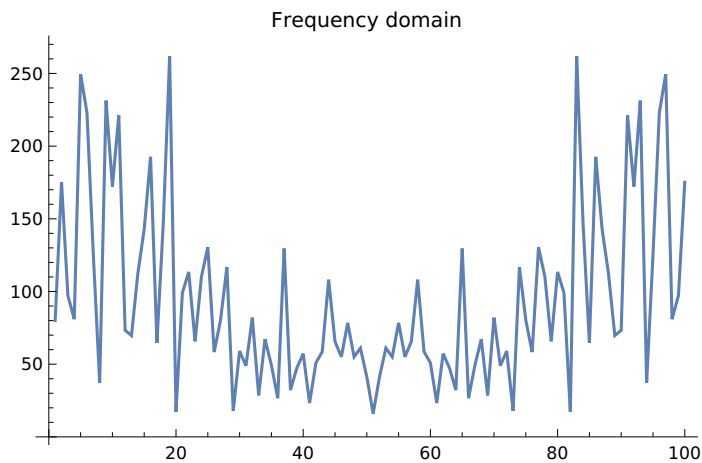
In[42]:= data =
  {0.00000, 0.00003, -0.00031, -0.00027, 0.00000, 0.00000, 0.00000, 0.00000, 0.00000,
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    0.00000, 0.00000, 0.00000, 0.00000, 0.00000, 0.00000, 0.00000, 0.00000, -0.00027,
    -0.00003, 0.00000, 0.00000, 0.00003, 0.00003, 0.00000, 0.00000, -0.00003,
    -0.00027, 0.00000, 0.00003, 0.00000, 0.00000, 0.00000, 0.00027, 0.00031, 0.00027,
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    0.00000, -0.00003, 0.00000, 0.00000, 0.00000, 0.00000, 0.00003, 0.00000, 0.00000,
    0.00003, 0.00031, 0.00031, 0.00000, 0.00003, 0.00000, -0.00003, 0.00000,
    0.00000, 0.00000, -0.00027, -0.00031, -0.00031, 0.00003, 0.00000, 0.00000,
    -0.00003, -0.00003, 0.00000, 0.00000, 0.00000, -0.00003, 0.00000, 0.00000,
    0.00003, 0.00000, 0.00000, 0.00000, 0.00000, 0.00000, 0.00027}*1000000;
ListLinePlot[data, PlotRange → All, PlotLabel → "Time domain"]
ListLinePlot[Abs[Fourier[data]], PlotRange → All, PlotLabel → "Frequency domain"]
Print["(100 samples) / ((8000 samples) / second) = ",
  (100 samples) / ((8000 samples) / second), " = (1/80) seconds = ", 1/80., " seconds"]

```

Out[43]=



Out[44]=



$$(100 \text{ samples}) / ((8000 \text{ samples}) / \text{second}) = \frac{\text{second}}{80} = (1/80) \text{ seconds} = 0.0125 \text{ seconds}$$

In[46]=

**Look *\*\*way\*\** down after all this data to see the fun stuff. By the way, this next cell defines data2.**

In[47]=

data2 =

```
{0.00000, 0.00003, -0.00031, -0.00027, 0.00000, 0.00000, 0.00000, 0.00000, 0.00000,
 0.00000, 0.00000, 0.00003, 0.00000, -0.00031, -0.00031, -0.00003, 0.00003,
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 -0.00003, 0.00000, 0.00000, 0.00003, 0.00003, 0.00000, 0.00000, -0.00003,
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```



[illegible]

[illegible]

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[illegible]





[illegible]

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[illegible]

[illegible]

[illegible]

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[illegible]

[illegible]

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[illegible]

[illegible]



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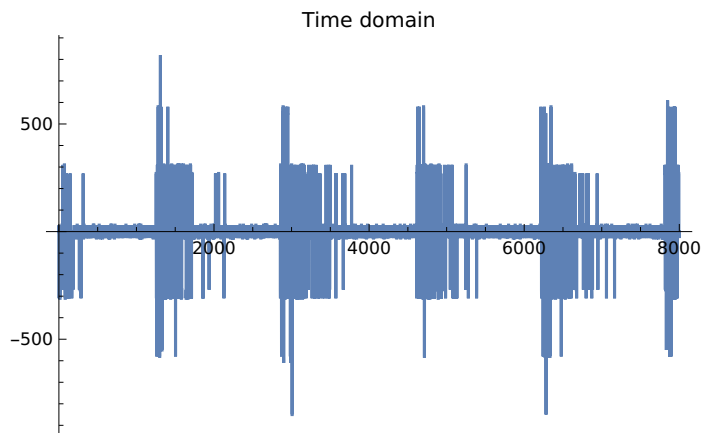
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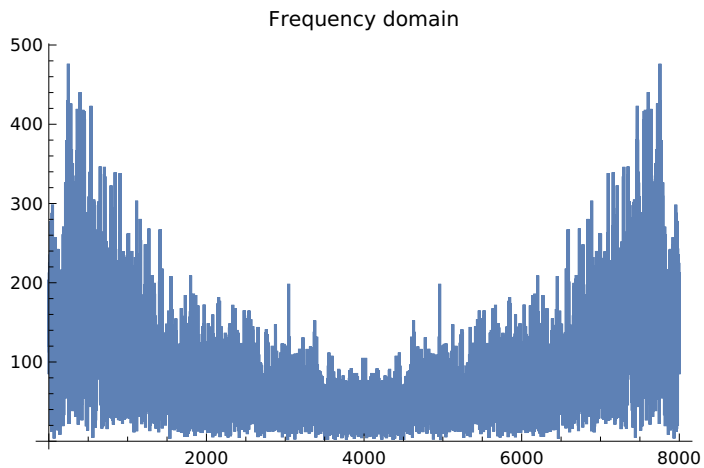
plotA = ListLinePlot[data2, PlotRange → All, PlotLabel → "Time domain"]
plotB =
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Print[" "]
Show[plotA, PlotRange → {{1200, 2200}, {-1000, 1000}}]
Print["One second of data is shown in the graph directly above this."]

```

Out[48]=

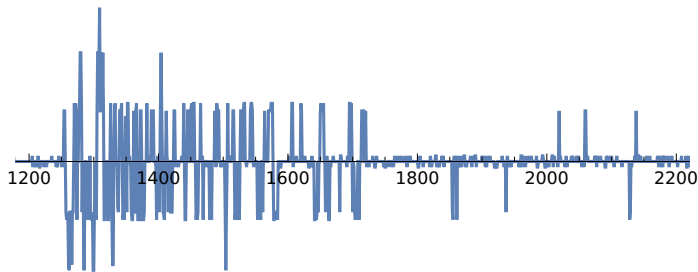


Out[49]=



Out[51]=

Time domain



One second of data.

It seems that our test has shown that we have, though not technically white noise, at least random pink noise. There doesn't seem to be any structure other than a (possible) small high-pass filter that suppresses things under 400 (Hz, I believe, is the unit, though it might be a scaled Hz unit). That would go along nicely with that fact that the frequency spectrum

☐ doesn't look like white noise, but more like pink noise. Maybe I should check the randomness with an entropy measure, but I'm just going to say that we don't have structure. Remember that only the first half of the Frequency-domain (a.k.a. the spectrum) is valid - the other is just a reflection, an artifact due to the way we sample as well as do Fourier Transforms (Discrete ones, at least). Remember the DFT Illustration we did before.